

Shedding more light on historical hypothetical records of some Paraguayan birds listed by A. de W. Bertoni

Paul Smith^{1,2*}, Sergio D. Ríos Díaz^{3,4}, Alice Cibois⁵

¹ FAUNA Paraguay, Encarnación, Paraguay, www.faunaparaguay.com.

² Para La Tierra, Reserva Natural Laguna Blanca, Santa Rosa del Aguaray, San Pedro, Paraguay.
www.paralatierra.org

³ Museo Nacional de Historia Natural del Paraguay, Km 10,5, Ruta Mcal. Estigarribia, Suc. De Correos N° 1, CP 2169 San Lorenzo, Paraguay. E-mail: sergiord40@gmail.com

⁴ Dpto. de Biología, Facultad de Ciencias Exactas y Naturales. Universidad Nacional de Asunción. San Lorenzo.

⁵ Natural History Museum of Geneva, Department of Mammalogy and Ornithology, CP 6434, CH-1211 Geneva 6, Switzerland. E-mail: alice.cibois@ville-ge.ch

* Corresponding Author: faunaparaguay@gmail.com

Abstract: The “Catálogos Sistemáticos de los Vertebrados del Paraguay”, published in two editions by Arnaldo de Winkelried Bertoni (1878-1973) during the early decades of the 20th Century, represented one of the first attempts to collate in a single work the available information about Paraguayan birds. However various species listed in these works have been the subject of much debate by subsequent authors. In this paper we review the historical reports of 14 such species cited by Bertoni that were treated in later works as hypothetical, making historical reference to overlooked literature from the period and suggesting new status designations for each.

Keywords: Berlepsch - Catálogos Sistemáticos - distribution - Puerto Bertoni - status - MHNG specimen.

INTRODUCTION

Following in the great tradition of Paraguayan-based naturalists began by Félix de Azara, Arnaldo de Winkelried Bertoni (1878-1973) was the principal student of the national fauna during the early 20th Century. Working under geographical and logistical constraints from his base at the family estate Puerto Bertoni (25°38'60"S, 54°34'60"W) and later in the capital Asunción, his major contributions were his “Catálogos Sistemáticos” of the Paraguayan vertebrate fauna which was published in two editions, an initial attempt in 1914, and a revised and updated version in 1939. Bertoni (1914, 1939) however employed a confusing and often inconsistent approach to referencing, distribution and listing which is easily misinterpreted.

Though Bertoni was an avid collector of specimens his Catálogos unfortunately do not make specific reference to them (though in many cases voucher specimens undoubtedly existed to support the records). The vast majority of his collections were subsequently lost, making it impossible to confirm in some cases which species were documented with specimens and which were based on

his field observations or those of others. The few remnants of his collections that have survived in Paraguay (mostly mammalian) are housed in a small museum at the Puerto Bertoni monument. As a result several species which Bertoni listed and for which no further records have been forthcoming have been more recently treated as “hypothetical” (Hayes, 1995; Guyra Paraguay, 2004). Two major recent critical reviews of the Paraguayan avifauna (Hayes, 1995; Guyra Paraguay, 2004) classified hypothetical species into a series of hierarchical categories reflecting different problems with records. The latest review (Guyra Paraguay, 2004) included 66 species in this category, with 33 considered “possible” and 30 considered “doubtful”, plus an additional 38 species that were “not evaluated” and 12 classed as “erroneously cited”. Several of these species have since been transferred to other categories (Smith & Ríos Díaz, 2014a, b; Smith *et al.*, 2014a), including some species that have been officially documented (Smith & del Castillo, 2006; Lesterhuis & Clay, 2011; Álvarez *et al.*, 2012; del Castillo, 2013; Smith *et al.*, 2014c), but questions still remain about some other species.

MATERIALS AND METHODS

The bibliographical history of reports of fourteen hypothetical species that were listed by or attributed to Bertoni (1914, 1939) are thus investigated. Museum specimens were examined or looked for in several institutions, listed below. Additional information is provided where available and new recommendations for their designations are made where necessary.

Abbreviations

AMNH American Museum of Natural History, New York, U.S.A.

FMNH Field Museum of Natural History, Chicago, U.S.A.

MHNG Muséum d'histoire naturelle de Genève, Switzerland

NHMW Naturhistorisches Museum Wien, Austria

RESULTS

Tigrisoma fasciatum (Such, 1825) Fasciated Tiger Heron

Hayes (1995) notes that Bertoni (1901) reported "*Tigrisoma (marmoratum?)*" (= *Tigrisoma lineatum*) for "Monda-ih" (= Río Monday, Departamento Alto Paraná), but that the immature specimen described was later re-identified as *T. fasciatum* (Such, 1825) by Lynch Arribálzaga (1902) on the basis of white streaks on the tail and lower back. However, members of this genus go through a complex series of ontogenie changes and white streaking is not considered diagnostic. The safest way to distinguish between the two species in immature plumage is bill morphology (Hancock & Kushlan, 1984). Bertoni (1918b) listed *T. fasciatum* but included a footnote in which he stated that "perhaps, as Ihering and I thought, it is just a form of *T. marmoratum*". Presumably for this reason he retained it as doubtful in Paraguay in both of his Catálogos (Bertoni, 1914, 1939). Laubmann (1939) treated this species in his synonymy of *T. lineatum marmoratum*.

More recently Meisel *et al.* (1992) list the species without details for Reserva Natural del Bosque Mbaracayú, Departamento Canindeyú but it has been omitted from all subsequent lists for the locality (eg, Fariña & Hostettler, 2003; Mazar Barnett & Madroño, 2003) and *Tigrisoma lineatum* is regularly encountered there. Additionally López (1994) included a sight record of two individuals at Estero Doña Cinthia, Departamento Presidente Hayes in July 1993 but these were then omitted from the summary table.

Guyra Paraguay (2004) cast doubt on these sight records but treated the species as "possible" on the basis of a specimen identified as this species in MHNG. Though they were unable to examine the specimen, they considered that it was probably misidentified based on the

unlikely locality of "km293 Ruta Trans Chaco" (Departamento Presidente Hayes). We were able to trace this immature specimen (MHNG 1720.070) collected by Dlouhy and Weber on 5 July 1985 and confirm from the straight culmen and slender bill that it is referable to *Tigrisoma lineatum*.

Given the potential for and history of confusion with immature *Tigrisoma lineatum*, undocumented sight records of *T. fasciatum* cannot be considered acceptable. We recommend that this species be removed from the list of "possible" species in Paraguay and considered "erroneously cited". However we note that records in Brazil are suggestive of potential occurrence in Paraguay.

Charadrius falklandicus Latham, 1790 Two-banded Plover

Listed as possible by Hayes (1995) and Guyra Paraguay (2004). Hayes (1995) states that Bertoni (1914) cites the species based on Ihering, "but the record is too far out of range to be credible". Guyra Paraguay (2004) add that they can find no mention of the species in Ihering (1904), but this is a misunderstanding as the citation to which Bertoni refers is actually Ihering & Ihering (1907: 49) where Paraguay is indeed listed in the species range but without any specific details. However one of the main sources for Ihering & Ihering (1907) was Sharpe (1896) and though Paraguay is omitted from the main distribution section, it is listed in the cited texts as "Berlepsch, J. f. O. 1887, p. 134 (Paraguay)". Berlepsch (1887) included the species with a query (?) only in his addenda of possible species.

We agree with Hayes (1995) that the record is unlikely to be credible but disagree with Berlepsch's (1887) assumption about the possible distribution of this species. The certainty given to this speculative listing by subsequent authors is at the root of all subsequent citations and thus we recommend that this species be treated as "erroneously cited" in Paraguay.

Aratinga auricapilla (Kuhl, 1820) Golden-capped Parakeet

Hayes (1995) considered the species "possible" on the basis of a poorly described record of a pair from Puerto Bertoni on 11 November 1918, of which the female was collected (Bertoni, 1918a). As Hayes (1995) correctly points out the measurements provided by Bertoni (1918a) (Length 305 mm; Wing 162 mm; Tail 140 mm) are indeed consistent with this highly distinctive species (Juniper & Parr, 1998), which is unlikely to be confused in the hand with any other regionally occurring psittacid.

Hayes (1995) notes that numerous specimens were taken in eastern Paraná between 1901 and 1929 (Oliveira Pinto, 1938; Collar *et al.*, 1992), but his grounds for sug-

gesting that the “origin of the birds may be questionable (i.e. escaped cagebirds)” seem entirely speculative. Furthermore Bertoni (1918a) notes that the year the specimen was taken was “abnormal due to the lack of fruit caused by cold”, conditions which might be considered consistent with natural vagrancy. Regardless of the poor description provided, we find no convincing reason to question Bertoni’s (1918a) identification. Though habitat loss and an alarming range reduction suggest that the re-appearance of the species in Paraguay may be extremely unlikely, we recommend that it be treated as “pending documentation”.

***Pyrrhura perlata* (Spix, 1824)
Pearly Parakeet**

Bertoni (1939) reports “*Pyrrhura perlata australis* Todd.” from “Pinasco, Chaco” (=Puerto Pinaseo, Departamento Presidente Hayes). Hayes (1995) considered the record doubtful adding that “if correctly identified the record undoubtedly represents escaped cagebirds or were imported from elsewhere”. In fact *australis* Todd, 1915 is a subspecies of Green-cheeked Parakeet *Pyrrhura molinae* Massena & Souancé, 1854 (Juniper & Parr, 1998) and not Pearly Parakeet *P. perlata*, and Puerto Pinasco is well within the known distribution of that species in Paraguay (Guyra Paraguay, 2005). As a result *P. perlata* should be added to the list of “erroneously cited” species.

***Sappho sparganura* (Shaw, 1812)
Red-tailed Comet**

Hayes (1995) notes the existence of a specimen (FMNH 46377) labeled “Paraguay” with the collectors name “White”, and correctly states that nobody of that name ever collected birds in Paraguay. This certainly refers to Ernest William White (1858-1884) an English collector, traveler and naturalist who worked extensively in Argentina until his untimely death (White, 1881; M. Pearman, in litt.) and is presumably also the “Paraguay” specimen that was examined by Cory (1918) without further comment. White (1881) mentions visiting certain Paraguayan ports on the Paraná River during a visit to Provincia Misiones in northern Argentina, but does not make reference to any collecting activity. White (1882) documents the collection of a male and a female of this species at the “City of Catamarca” on 12 August 1880, but states that the species occurs “somewhat sparsely over the upper provinces of the Republic”. If collected by White this specimen likely came from Argentina and not Paraguay.

Zotta (1937) includes “S. Paraguay” in the distribution of the species and Bertoni (1939) lists *Sappho sappho* (sic) with locality “S. W. Paraguay S. O. P.” The initials S.O.P.

refer to Sociedad Ornitológica del Plata, presumably in direct reference to Zotta (1937), however it is unclear why Bertoni added “S. W.” to the distribution given in that work. The basis of the change may be related to a brief letter published in *Ibis* (Sclater, 1893) in which it is suggested that the species “should probably be added” to the Paraguayan avifauna because of its occurrence in “Northern Argentina”. Regardless the lack of clarity and specific details means that the species should best be retained as “possible” pending further data.

***Celeus torquatus* (Boddaert, 1783)
Ringed Woodpecker**

Listed as a “doubtful” species by Hayes (1995) and “not evaluated” by Guyra Paraguay (2004). Hayes (1995) gives the source as Bertoni (1914: 49) who cites “*Cerchneipicus tinnunculus* (Wagl.)” but without locality. In fact, the source for this is also Ihering & Ihering (1907) who list the range of *C. tinnunculus* as “Paraguay, Matto Grosso e Amazônia, Pará, Rio Negro, Bahía” and of *C. torquatus* as “Rio Negro, Amazônia inf., Pará, Pernambuco, Guyana e Venezuela”. These two forms were subsequently synonymized under *Celeus torquatus* (Peters, 1964).

However the distribution provided by Ihering & Ihering (1907) is highly inaccurate according to current knowledge (Winkler *et al.*, 1995) and one of the principal references of that work was Hargitt (1890) who described the distribution of *C. tinnunculus* as “Eastern Brazil (Bahía), and westward in Matto Grosso to the Paraguay and Guapore Rivers”. We suspect that this may have then been over-extrapolated to include Paraguay and thus we agree with Hayes (1995) that this species should be considered “doubtful”.

***Myiothlypis leucophrys* (Pelzeln, 1868)
White-striped Warbler**

Hayes (1995) lists this species as “doubtful” stating that the species was “reported at Río Paraná (Bertoni, 1939: 23), perhaps referring to records farther north in Brazil”. Guyra Paraguay (2004) follow the same course without additional comment. In fact the deployment of a different font for this species by Bertoni (1914, 1939) implies that the species had not been reported in Paraguay but was of potential occurrence. The locality cited by Bertoni (1914, 1939) “Río Paraná, S.P., Goyas, (Bras.)” repeats Ihering & Ihering (1907) who gave an identical distribution for the species in Brazil. Consequently this species has never been claimed to occur in Paraguay and we recommend that it be added to the list of “erroneously cited species”.

***Paroaria gularis* (Linnaeus, 1766)
Red-capped Cardinal**

Bertoni (1914, 1939) listed this species without locality data presumably on the basis of a specimen reported by Salvadori (1895) from "Porto Pagani, Río Apa" collected sometime between August and November 1893. However Salvadori (1895) states that the specimen had a yellow bill, prompting Hayes (1995) to consider the record doubtful as the description "clearly refers to the Yellow-billed Cardinal *P. capitata*". Earlier however Hellmayr (1938) had included it in the synonymy of *P. capitata* (d'Orbigny & Lafresnaye, 1837) after examining the specimen in the Turin museum, and had rebuked Bertoni for including it in the Paraguayan avifauna "evidently without having seen a specimen". As a result this species should be added to the list of "erroneously cited species".

***Turdus ignobilis* Sclater, 1858
Black-billed Thrush**

Listed as "doubtful" by Hayes (1995) and Guyra Paraguay (2004), the former stated that this species was "reported at N.W. Chaco?" by Bertoni (1939:34). However Bertoni (1914, 1939) makes no mention of *Turdus ignobilis*, though both list "*Turdus phaeopygus* Cab." as hypothetical (indicated by the employment of a different font in each case). Bertoni (1939) gives the locality for *T. phaeopygus* as "Amazonia a Venezuela, N.W. Chaco?".

Bertoni (1907), reporting "*Merula crotapeza* (Licht.)" had earlier stated he could find no differences between the specimens of "*Merula phaespyga* [sic] (Cab.)" that he had examined in the Rio de Janeiro museum and "*M. metallophona* Bertoni", additionally mentioning the possibility of synonymy between *phaespyga* and *crotapeza*. He then subsequently suggested that all three were conspecific (Bertoni, 1913), adding that *T. subalaris* could represent the adult male of *T. phaeopygus* Cabanis (= *Turdus albicollis phaeopygus*). However in a later publication his position changed again, stating that *Planesticus metallophonus* was referable to a "young male" of *P. subalaris* and that *P. crotapezus* and *P. phaeopygus* were distinct (Bertoni, 1928). A foot note in Bertoni (1914, 1939) notes that he was able to examine an Amazonian specimen of *T. phaeopygus* (likely the same one referred to in Bertoni, 1907) which he describes as "very difficult to separate from young *T. subalaris*; but the external primary (character of value) is somewhat longer and the rectrices are less covered by the tertials and if this is not constant it would be difficult to distinguish the two species".

Hellmayr (1934) examined a Bertoni specimen (Museu Paulista, No. 7064. Puerto Bertoni, Sept. 15, 1906) of "the bird first described as *T. metallophonus* and later consecutively identified as *Merula crotapeza* and *Turdus phaeopygus*" and found that this was "identical with the

type of *M. subalaris*". As a result *T. phaeopygus* of Bertoni was included in the synonymy of *Turdus subalaris* (Seeböhm) by Hellmayr (1934) who also clarified that it was not the same as *Turdus phaeopygus* of Cabanis (= *Turdus albicollis phaeopygus*). Bertoni (1939) seems to have been unaware of that publication.

As no apparent reference to *Turdus ignobilis* in Paraguay thus exists, its inclusion by Hayes (1995) appears to be a misunderstanding. We thus suggest that it be added to the list of "erroneously cited species".

***Turdus fumigatus* Lichtenstein, 1823
Cocoa Thrush**

First cited for Paraguay by Bertoni (1919) and mentioned again by Bertoni (1926) as a species that had been recorded just once in his 30 years of field work. Hayes (1995) considered the species doubtful because the description of the "juvenile female is inadequate" and this position was followed by Guyra Paraguay (2004) without further comment.

Bertoni (1919) describes the single specimen of "*Planesticus fumigatus*" as being taken in August 1917 in Puerto Bertoni and that the identification "does not appear doubtful" because according to Ridgway (1907) the "first phalange of the middle toe is completely unified with the outer toe". However Hellmayr (1934) stated that the "cohesion of the anterior toes certainly is not greater than in some other species, such as *T. leucomelas*" and that the generic separation of *Planesticus* for *T. fumigatus* and its allies is thus without foundation.

Turdus leucomelas Vieillot, 1818 is an abundant species in eastern Paraguay and the grounds for assigning this specimen to *T. fumigatus* solely using toe morphology thus appears baseless, though he may have been encouraged in this decision by Berlepsch's (1887) inclusion of the species on a list of species of probable occurrence in Paraguay. However, given that the known distribution of that species does not closely approach Paraguay (Clement & Hathaway, 2000), there have been no subsequent records and the diagnostic character employed by Bertoni (1919) implies a serious misunderstanding, we recommend that this species be added to the list of "erroneously cited species".

***Caryothraustes canadensis* (Linnaeus, 1766)
Yellow-green Grosbeak**

Hayes (1995) and Guyra Paraguay (2004) consider the species "doubtful", the former stating "reported at Jejuí, presumably the Río Jejuí Guazu..." (Bertoni 1939: 37) but no details provided: if a valid record, it probably represented an escaped cagebird." Bertoni (1925) however provides details of the observation of "several pairs" during March 1920, in bushes close to forest of the Rio Verde (23°45, 56°20), coordinates that

place the locality within Departamento San Pedro in the area of the Arroyo Verde, a few kilometres northwest of Laguna Blanca. Bertoni (1925) compares the birds to *Hemithraupis guira* (Linnaeus, 1766) in colour, and also *Gubernatrix cristatella* (= *Gubernatrix cristata* Vieillot, 1817) from which it differs by the lack of the crest.

The area from where the species is reported is within the Cerrado zone of Paraguay and quite different from the humid forest that this species prefers in its normal range, and given the lack of a specimen we consider it “doubtful”. However we note a superficial resemblance of this bird to Cinnamon Tanager *Schistochlamys ruficapillus* (Vieillot, 1817), a species that occurs sporadically in the Paraguayan Cerrado, has a preference for wet habitats in dry areas (Isler & Isler, 1999) and which perhaps could account for this record if poorly seen. Perhaps coincidentally, the first Paraguayan specimen of *S. ruficapillus* was taken during the same year on 20 June 1920 (Zapata, 2003).

***Phrygilus dorsalis* Cabanis, 1883**
Red-backed Sierra-Finch

Contrary to the opinion of Hayes (1995), the listing of “*Myiospiza dorsalis* (Ridgw.)” without details by Bertoni (1939) and attributed to “Pereyra” is not in reference to this species but in reference to *Coturniculus manimbe* var. *dorsalis* Ridgway, 1874 (Baird *et al.*, 1874). This is a synonym of *Myiospiza humeralis xanthornus* (Darwin, 1839) [= *Ammodramus humeralis* (Bosc, 1792)] (Hellmayr, 1938). Wetmore (1926) reported “*Myiospiza humeralis dorsalis*, Paraguay (Puerto Pinasco)” also in reference to this form. The species should be added to the list of “erroneously cited species”.

***Sporophila melanops* (Pelzeln, 1870)**
Hooded Seedeater

Hayes (1995) considered the species doubtful as Bertoni (1914, 1939) listed the species as one of the members of Azara’s (1802) unidentifiable composite description of bird No. 126 (Pico grueso variable) jointly with *S. cinnamomea*, *S. nigroaurantia* and *S. pileata*. The association with Azara was probably also the reason for the locality “Asunción” given for *S. melanops* and *S. nigroaurantia* in Bertoni (1939). This highly speculative approach received a further rebuke from Hellmayr (1938) who stated that its inclusion in the Pico grueso variable “as is assumed by Bertoni... remains to be proved by the actual taking of specimens in Paraguay”. No specimens have been forthcoming and the species itself is of dubious validity, being known only from a single old specimen held at the NHMW collected by Natterer on 19 October 1823 at Porto do Rio Araguaya, Goiás, Brazil. With no concrete evidence

of the species ever having occurred in Paraguay and Bertoni’s speculation completely unfounded, it should be added to the list of “erroneously cited species”.

***Sporophila albogularis* Spix, 1825**
White-throated Seedeater

Considered “doubtful” by Hayes (1995) on the basis of Bertoni (1914, 1939) listing the species with a query. The species was also listed for Paraguay with a query by Ihering & Ihering (1907) who followed Sharpe (1888) in citing the main range as “Bahia” (Brazil). However Bertoni cites “Oberh.” as the source of his uncertainty in reference to Oberholser (1902) who commented on a collection of birds taken by William T. Foster at “Sapucay” (= Sapucáí, Departamento Paraguari). Oberholser’s text states that the bird is a female that “apparently belongs to this species” but provides no basis for the identification other than listing the iris colour as “brown”. However the AMNH now holds no specimens of this genus collected by Foster in Paraguay (T. Trombone in litt.). Regardless the female of *S. albogularis* possesses no obvious diagnostic characters that might confirm such an identification (Ridgely & Tudor, 1989) so far outside of the species known range and is thus almost certainly in error. The species should thus be listed as “erroneously cited”.

CONCLUDING REMARKS

Bertoni (1914, 1939) states that he had “the honour of being assisted by” the founder and director of the Museu Paulista Hermann von Ihering (1850-1930) during his visit to São Paulo in 1905, and it is clear throughout his catalogue that he placed considerable trust in his learned colleague’s judgement (Smith *et al.*, 2014b). German born Ihering had first travelled to Brazil in 1880 in order to carry out scientific exploration for the German Imperial government, being funded in part by the wealthy aristocratic ornithologist Hans Hermann Carl Ludwig von Berlepsch (1850-1915) with whom he shared close contact.

Berlepsch (1887) had earlier produced the first attempt at a list of the species of Paraguay, which included as an addendum 113 species for which “occurrence in Paraguay cannot be proven, but based on known distribution their presence can be safely assumed”. Whilst he was indeed correct in most cases, current knowledge suggests he made some errors of judgement which have since found themselves into the literature. The respect in which Bertoni held his esteemed colleagues and the network of contacts which he held with them either directly or indirectly can thus be demonstrated to have had considerable influence on Paraguayan ornithology in the early years of the 20th Century, and explains the inclusion of some of the hypothetical species dealt with herein.

Another common source of error is the incorrect association of older names with similar names in current usage for completely different taxa (Smith & Ríos Díaz, 2014b). These easily avoidable misunderstandings are caused principally by the undesirable tendency in recent ornithology to omit authors of taxa.

ACKNOWLEDGEMENTS

Thanks to Dr Julio Contreras and Mark Pearman for information regarding the collecting activities of Ernest W. White. Rob Clay provided useful comments on an early draft of this manuscript. Though ultimately unsuccessful, Thomas Trombone was very helpful in attempting to track down the *Sporophila albogularis* specimen in the AMNH. The pioneering ornithological work of (in no particular order) Berlepsch, Bertoni and Ihering deserves the highest praise at a time when such endeavours required far more effort and skill than they do today. That their work continues to be referenced over a century later is testament to its value.

REFERENCES

- Álvarez A., Amarilla L., Fernández R. 2012. Primer registro reportado de loro keréu (*Amazona xanthops*) en la ecorregión cerrado del Paraguay. *Compendio de Ciencias Veterinarias* 2(2): 7-11.
- Azara F. de 1802. Apuntamientos para la historia natural de los páxaros del Paraguay y Rio de la Plata. *Imprenta de la Viuda Ibarra, Madrid*.
- Baird S.F., Brewer T.M., Ridgway R. 1874. A history of North American Birds. *Little Brown, Boston*.
- Berlepsch H. von. 1887. Appendix systematisches verzeichniss in der Republik Paraguay bisher beobachteten vogelarten. *Journal für Ornithologie* 35(2): 113-134.
- Bertoni A. de W. 1901. Aves nuevas del Paraguay. *Anales Científicos Paraguayos* 1(1): 1-216.
- Bertoni A. de W. 1907. Segunda contribución a la ornitología Paraguaya. Nuevas especies Paraguayas. *Revista del Instituto Paraguayo* 1906: 298-309.
- Bertoni A. de W. 1913. Contribución para un catálogo de las aves Argentinas. *Anales de la Sociedad Científica de Argentina* 75: 64-96.
- Bertoni A. de W. 1914. Fauna Paraguaya. Catálogos sistemáticos de los vertebrados del Paraguay. *Gráfica M. Brossa, Asunción*.
- Bertoni A. de W. 1918a. Adiciones a los vertebrados del Paraguay. *Anales Científicos Paraguayos* 2(3): 233-241.
- Bertoni A. de W. 1918b. Índice sistemático de las aves nuevas del Paraguay. *Anales Científicos Paraguayos* 2(3): 245-246.
- Bertoni A. de W. 1919. Especies de aves nuevas para el Paraguay. *El Hornero* 1(4): 255-258.
- Bertoni A. de W. 1925. Aves Paraguayas poco conocidas. *Revista de la Sociedad Científica del Paraguay* 2(1): 68-70.
- Bertoni A. de W. 1926. Apuntes ornitológicos. *El Hornero* 3(4): 396-401.
- Bertoni A. de W. 1928. Sobre el *Planesticus subalaris*. *Revista de la Sociedad Científica del Paraguay* 2(4): 187-188.
- Bertoni A. de W. 1939. Catálogos sistemáticos de los vertebrados del Paraguay. *Revista de la Sociedad Científica del Paraguay* 4(4): 3-60.
- Boddaert, P. 1783. Table des planches enluminées d'histoire naturelle de M. D'Aubenton : avec les dénominations de M.M. de Buffon, Brisson, Edwards, Linnaeus et Latham, précédé d'une notice des principaux ouvrages zoologiques enluminés. *Utrecht*.
- Bosc L. 1792. *Tanagra humeralis*. *Journal d'histoire naturelle* 2 (1792): 179-180.
- Cabanis J. 1883. Deutsche Ornithologische Gesellschaft: Bericht über die Januar-Sitzung. *Journal für Ornithologie* ser. 4, 31: 106-111.
- Clement P., Hathaway R. 2000. Thrushes. *Christopher Helm, London*.
- Collar N.J., Gonzaga L.P., Krabbe N., Madroño Nieto A., Naranjo L.G., Parker III T.A., Wege D.C. 1992. Threatened birds of the Americas: The ICBP/IUCN red data book, 3rd edition, part 2. *Smithsonian Institution Press, Washington and London*.
- Cory C.B. 1918. Catalogue of the birds of the Americas Part 2, Number 1. *Field Museum of Natural History Publication* 197, *Zoological Series* 13: 1-315.
- Darwin C. R. ed. 1839. Birds Part 3 No. 2 of The zoology of the voyage of H.M.S. Beagle. by John Gould. Edited and superintended by Charles Darwin. *Smith Elder and Co., London*.
- del Castillo H. 2013. Actualización de la lista comentada de las aves comentadas de Paraguay (Guyra Paraguay 2004). *Paraquaria Natural* 1(1): 6-9.
- d'Orbigny A., Lafresnaye F. 1837. Synopsis Avium. *Magasin de Zoologie* 7: 1-88.
- Fariña R., Hostettler T. 2003. Vertebrados de la Reserva Natural del Bosque Mbaracayú checklist. *Fundación Moises Bertoni, Asunción*.
- Guyra Paraguay. 2004. Lista comentada de las aves del Paraguay. *Guyra Paraguay, Asunción*.
- Guyra Paraguay. 2005. Atlas de las aves del Paraguay. *Guyra Paraguay, Asunción*.
- Hancock J., Kushlan J. 1984. The herons handbook. *Croom Helm, London*.
- Hargitt E. 1890. Catalogue of birds in the British Museum volume 18. Scansores containing the family Picidae. *British Museum of Natural History, London*.
- Hayes F.E. 1995. Status, distribution and biogeography of the birds of Paraguay. *American Birding Association Monographs in Field Ornithology* 1, *Albany*.
- Hellmayr C.E. 1934. Catalogue of the birds of the Americas Part 7. *Field Museum of Natural History Publication* 330, *Zoological Series* 8: 1-531.
- Hellmayr C.E. 1938. Catalogue of the birds of the Americas Part 11. *Field Museum of Natural History Publication* 430, *Zoological Series* 13: 1-662.
- Ihering, H. von 1904. As aves do Paraguay em comparação com as de São Paulo. *Revista do Museu Paulista* 6: 310-384.
- Ihering A. Von, Ihering R. Von. 1907. As aves do Brasil. *Museu Paulista, São Paulo*.
- Isler M.L., Isler P.R. 1999. Helm identification guides: Tanagers. *Christopher Helm, London*.
- Juniper T., Parr M. 1998. Parrots: A guide to the parrots of the world. *Pica Press, Surrey*.
- Kuhl H. 1820. Conspectus Psittacorum. *Nova Acta Academiae Caesareae Leopoldino-Carolinae Germanicae Naturae Curiosorum* 10: 1-104.

- Latham J. 1790. Index Ornithologicus, sive systema ornithologiae. *Leigh and Sotheby, London*.
- Laubmann A. 1939. Die Vögel von Paraguay I. *Strecker und Schröder Verlag, Stuttgart*.
- Lesterhuis A.J., Clay R.P. 2011. Confirmation of the occurrence of rufous-chested dotterel and semipalmated plover in Paraguay. *Wader Study Group Bulletin* 118(2): 127-128.
- Lichtenstein H. 1823. Verzeichniss der Doubletten des Zoologischen Museums der Königl. Universität zu Berlin: nebst Beschreibung vieler bisher unbekannter Arten von Säugthieren, Vögeln, Amphibien und Fischen / herausgegeben von H. Lichtenstein. In *Commission bei T. Trautwein, Berlin*.
- Linnaeus C. von 1766. Caroli a Linné ... Systema naturae : per regna tria naturae, secundum classes, ordines, genera, species, cum characteribus, differentiis, synonymis, locis. *L. Salvii, Holmiae*.
- López N. 1994. Resultados del censo en Paraguay (pp. 38-48). In: Blanco D.E., Canevari P. (eds). Censo Neotropical de aves acuáticas 1993. *Humedales para las Americas, Buenos Aires*.
- Lynch Arribáizaga E. 1902. Apuntes críticos sobre las aves del Paraguay descritas por el Señor Arnaldo de Winkelried Bertoni. *Anales del Museo Nacional de Buenos Aires serie 2*, 7(4): 329-389.
- Massena F.V., Souancé C. de 1854. Description de quelques nouvelles espèces d'oiseaux de la famille des Psittacides. *Revue et Magasin de Zoologie pure et appliquée série 2*, 6: 71-74.
- Mazar Barnett J., Madroño A. 2003. Aves de la Reserva Natural del Bosque Mbaracayú. *Fundación Moises Bertoni, Asunción*.
- Meisel J.E., Van Humbeeck A. & Morales M. 1992. Reserva Natural del Bosque del Mbaracayú: Lista preliminar de las aves de la reserva. *Fundación Moises Bertoni, Asunción*.
- Oberholser H.C. 1902. List of birds collected by William T. Foster in Paraguay. *Proceedings of the United States National Museum* 25(1281): 127-147.
- Oliveira Pinto O.M. de. 1938. Catalogo das aves do Brasil e lista de exemplares que as representam no Museu Paulista. *Revista do Museu Paulista* (22): 1-566.
- Pelzeln A. von 1868-1870. Zur Ornithologie Brasiliens: Resultate von Johann Natterers Reisen in den Jahren 1817 bis 1835 / dargestellt von August von Pelzeln. A. Pichler's Witwe & Sohn, Wien.
- Peters J.L. 1964. Check-list of the birds of the world volume 6. *Harvard University Press, Cambridge*.
- Ridgely R., Tudor G. 1989. The birds of South America: The oscine passerines. *Oxford University Press, Oxford*.
- Ridgway R. 1907. The birds of North and Middle America. *Bulletin of the United States National Museum* 50(4): 1-973.
- Salvadori T. 1895. Viaggio del dott. Alfredo Borelli nella Repubblica Argentina en el Paraguay. Uccelli raccolti nel Paraguay, nel Matto Grosso, nel Tucuman e nella Provincia di Salta. *Bollettino dei Musei di Zoologia ed Anatomia Comparata delle R. Università di Torino* 10(208): 1-24.
- Sclater P.L. 1858. Synopsis Avium Tanagrarum - A descriptive catalogue of the known species of tanagers. *Proceedings of the Zoological Society London* 1858: 230-292.
- Sclater P.L. 1893. The humming-birds of Paraguay. *Ibis* 6 (5): 285-286.
- Sharpe R. B. 1888. Catalogue of birds in the British Museum volume 12. Fringilliformes Part 3 containing the family Fringillidae. *British Museum of Natural History, London*.
- Sharpe R. B. 1896. Catalogue of birds in the British Museum volume 24. Limicolae. *British Museum of Natural History, London*.
- Shaw G. 1812. Bar-tailed humming-bird (pp. 191-192). In: Shaw G., Griffith Mrs, Heath C., Stephens J.F. (eds). General zoology, or Systematic natural history, by George Shaw ... with plates from the first authorities and most selected specimens, engraved principally by Mr. Heath (eds.). *G. Kearsley, London*.
- Smith P., Del Castillo H. 2006. Common tern *Sterna hirundo*: A new species for Paraguay. *Bellbird* 1: 35-37.
- Smith P., Ríos Díaz S.D. 2014a. Comments on supposed occurrence of Andean Avocet and American Oystercatcher in Paraguay. *Dutch Birding* 36: 26-29.
- Smith P., Ríos Díaz S.D. 2014b. On certain specimens reported for Paraguay by F. Schade & R. Masi Pallarés: Southern Wigeon *Anas sibilatrix* (Aves: Anatidae) and Azure-winged Tanager *Thraupis cyanoptera* (Aves: Thraupidae). *Paraguaria Natural* 2(2): 66-68.
- Smith P., Cibois A., Straube F. 2014a. On the Paraguayan specimens of *Nothura darwinii* (Aves: Tinamidae) and *Glaucis hirsutus* (Aves: Trochilidae) in the collection of the Natural History Museum of Geneva (Switzerland), with a review of south Brazilian reports of the latter. *Revue suisse de Zoologie* 121(1): 3-9.
- Smith P., Owen R., Del Castillo H., Ortíz M.L., Cabrera A. 2014b (2013). Historical and recent records of greater grison *Galictis vittata* in Paraguay with nomenclatural notes. *Small Carnivore Conservation* 49: 43-47.
- Smith P., Pérez N., Derna R., Colmán A., Del Castillo H., Álvarez, A. 2014c. On the presence of rusty-margined flycatcher *Myiozetetes cayanensis* in Paraguay. *Alauda* 82(1): 71-72.
- Spix J.B. v. 1824, 1825 (1840). Avium species novae quas in itinere per Brasiliam annis MDCCCXVII-MDCCCXX jussu et auspiciis Maximiliani Josephi I. Bavariae Regis. Typis. Franc. Seraph. Hubschmann, DE.
- Such G. 1825. Description of some hitherto uncharacterized Brazilian birds. *Zoological Journal* 2: 110-117.
- Todd W.E.C. 1915. Preliminary diagnoses of apparently new South American birds. *Proceedings of The Biological Society of Washington* 28: 79-82.
- Vieillot L.J.P. 1817-1818. In: Nouveau dictionnaire d'histoire naturelle. *Chez Deterville, Paris*.
- Wetmore A. 1926. Observations on the birds of Argentina, Paraguay, Uruguay and Chile. *Bulletin of the United States National Museum* 133: 1-448.
- White E.W. 1881. Cameos from the silver-land; or the experiences of a young naturalist in the Argentine Republic. *John Van Voorst, London*.
- White E.W. 1882. Notes on birds collected in the Argentine Republic. *Proceedings of the Zoological Society of London* 50(4): 591-629.
- Winkler H., Christie D.A., Nurney, D. 1995. Woodpeckers: A guide to the woodpeckers, piculets and wrynecks of the world. *Pica Press, Surrey*.
- Zapata A.R.P. 2003. Primer registro de *Schistochlamys ruficapillus ruficapillus* (Emberizidae) para Paraguay. *El Hornero* 17(2): 97-98.
- Zotta A.R. 1937. Lista sistemática de las aves Argentinas. *El Hornero* 6(3): 531-554.